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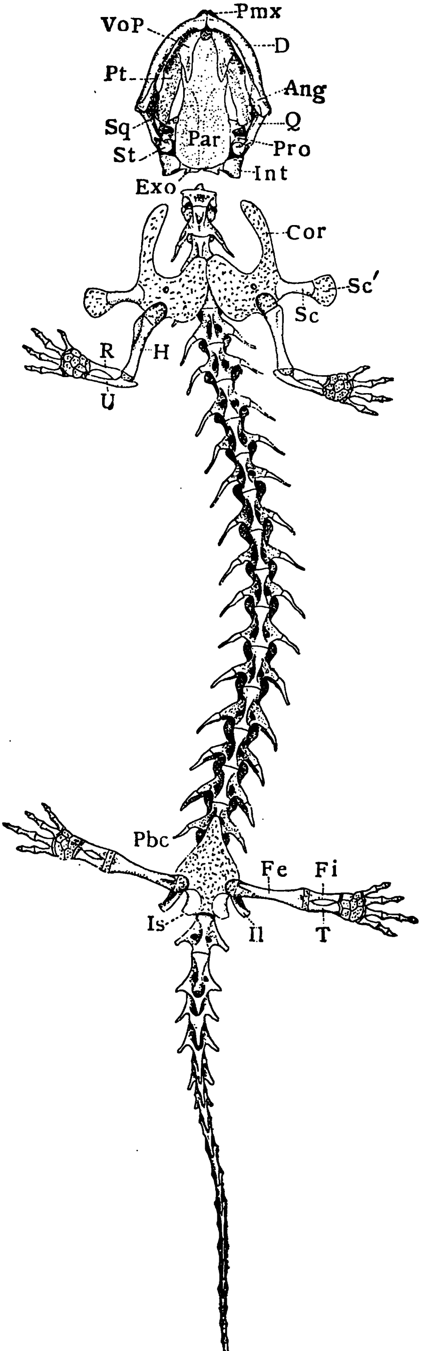
PLATE XXXVIII.



Cryptobranchus Alleghaniensis.

RECENT LITERATURE.

Cope's Batrachia of North America.[1]—This is an octavo of 515 pages, with eighty-one plates executed by phototype process, issued by the U. S. National Museum as its Bulletin No. 34. It is one of a series of monographs on North American Vertebrata projected by Professor Baird at the time of the establishment of the Museum of the Smithsonian Institution, which has since become the U. S. National Museum. The monographs of the Mammalia and Birds were published by Professor Baird himself, as Volumes VIII. and IX. of the Reports of Surveys for a Railroad to the Pacific Ocean. The preparation of those on the Reptilia and Batrachia were delegated to Professor Cope, and he has been for some years accumulating the material and observations which are described and recorded in the present volume. Although not published in the same form and style as the monographs of the Mammalia and Birds, the present volume will be welcome to students of the interesting forms of which it treats, and none the less on account of its convenient size. The large material of the National Museum has been thoroughly sifted, the characters of the species defined, and their varieties pointed out. In the latter regard the work will be found to be especially useful to students of specific variation, as numerous sub-species are defined, and their distinction from mere varieties dwelt on. The total number of species described is 107, which are referred to 31 genera. The species are distributed in their orders as follows: Proteida, 2; Urodela, 53; Trachystomata, 2; Salientia, 50.

Among the new species described may be mentioned *Batrachoseps caudatus*, a salamander with an excessively long tail, from Alaska; a species of the tropical genus Hypopachus (*H. cuneus*) from Southwest Texas, and a new Bufo (*B. aduncus*) from Northern Texas.

The organography is extensively described and figured, but only the osteology is very completely represented. This portion of the work is thorough, and includes many new observations, especially on the carpus, tarsus and hyoid apparatus. A figure of the skeleton of the larva of the *Chondrotus tenebrosus* of the streams of California and Oregon is given, and its remarkable characters are pointed out in the text. The remarkable hyoid of the *Chioglossa lusitanica* is described for the first time. We copy here the figure of the inferior view of the skeleton of the hellbender (*Cryptobranchus alleghaniensis*), and a view of the viscera of the *Siren lacertina* (Plates XXXVIII and XXXIX).

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[1] The Batrachia of North America, by E. D. Cope: Bulletin of the U. S. National Museum, No. 34; Washington; issued July 15th, 1889.

The illustrations are, with a few exceptions, well executed, but the paper on which they are printed is poor. To this may be excepted two lithographs which close the series. The subject is not, however, so fully illustrated as its scope demands, as there should be plates of the principal features of every genus. This we do not find, although some of the genera, as Amblystoma, Hyla, Bufo, and Rana, may be excepted from this criticism. An especially valuable feature of the work to American students is the illustration of the osteology of genera exotic to North America. This feature, together with the exhaustive character of the systematic analysis, renders the book a manual of the class at large.

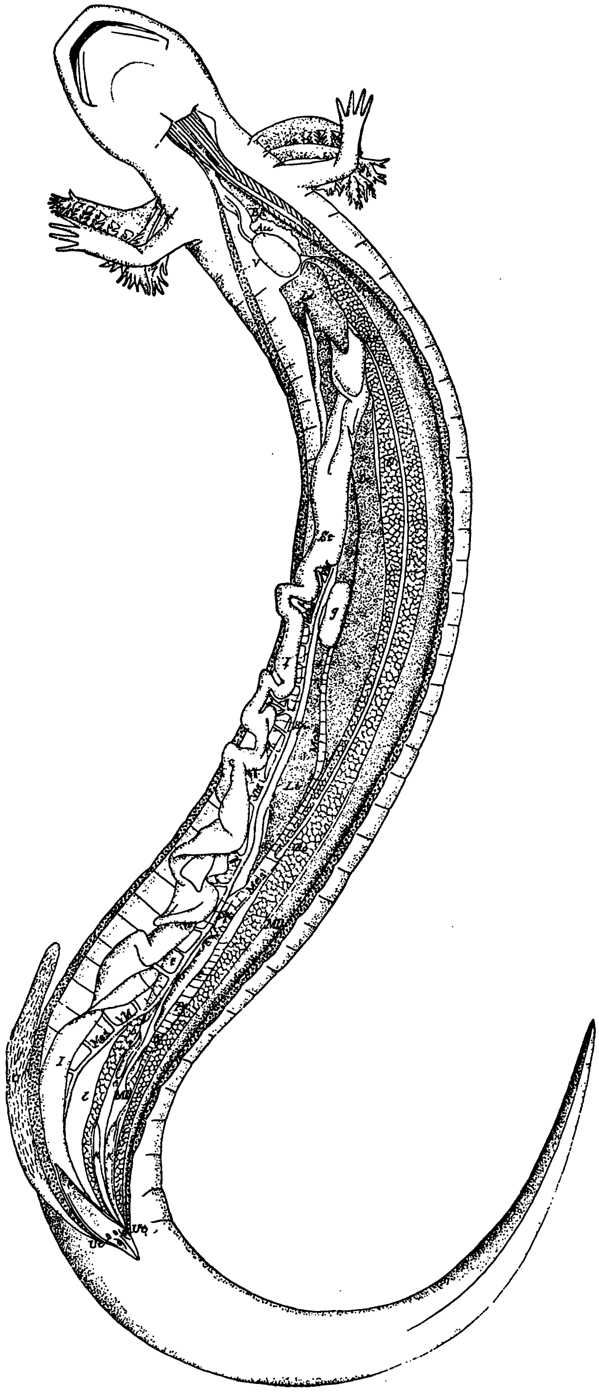
Frequent reference to the habits of the species is made. We make the following extracts descriptive of the ways of these often abundant denizens of our forests and swamps. Of the *Amblystoma tigrinum*, Prof. Cope remarks (p. 83):

"The larvæ of this species are exceedingly abundant in all still water in the Rocky Mountain region and the plains. They are rapacious, eating animal food, and taking the hook readily. Late in the summer they complete their metamorphoses and take to the land, where they hide in the holes of marmots, badgers, etc. From these they emerge during and after rains. The larvæ are much less frequently seen in the East, where the species is less abundant, and the opportunities of concealment are greater. Market Lake is a temporary body of water covering many square miles in Eastern Idaho. It is formed by the overflow of the Snake River in Spring. On its shores I have found this species. On the shore of an adjacent pond of more permanent character I have observed this species occupying vertical holes, which were kept filled with water by occasional waves, but from which their heads emerged into the air. In this position their branchiæ were gradually absorbed. An adult from New Jersey occupied a burrow in the soil of my fernery for several weeks. The burrow had two orifices, in one or the other of which its head could be generally seen, observing what was going on."

The larva of *Chondrotus tenebrosus* is thus described:

"The larva of this species frequently exceeds in dimensions that of any other species, and quite equals the adult. It is a uniform lead color, or sometimes blackish, and the muzzle is rather abruptly shortened. The tail has a fin at its extremity, which extends also well anteriorly on the superior edge. The digits are flattened, and their apices are protected in many specimens by a horny cap of a blackish color. This larva, however, differs from that of other species of the genus in other characters of more importance. First. There are no

PLATE XXXIX.



Siren lacertina.

teeth on the splenial bone. (I have not examined very small specimens.) Secondly. The branchiæ have a peculiar shape. There are no processes such as exist in all other Urodele larvæ, but the fimbriæ arise from the edges of the vertical laminæ which separate the pharyngeal fissures (Fig. 3, p. 3, No. 7). The superior part of the lamina is a little more produced than the inferior, so as to form in some specimens, on the third lamina, a short process. This type of external branchiæ does not resemble any of those of the perennibranchiate types, where there are always processes which are frequently furnished with more or less numerous rami. Thirdly. The teeth of the larva are stronger than in the adult. They are compressed, double-edged, and acute. Having thus a dagger-shape, they can inflict a severe bite.

"As they approach maturity, the marbled colors begin to appear. They can probably reproduce without undergoing a metamorphosis, since I have found eggs in the ovaries ready for deposit.

"I observed these larvæ in some tributaries of the McCloud River, near Baird, Cal. They swam with great rapidity, darting about and hiding themselves among the fallen leaves that covered the bottom. I took from the stomach of one of them a larva of its own species of one-third its size. They are common in the mountain streams of Northern California and Western Oregon. The skeleton of a large specimen from Salem, Oregon, is figured on Plates 20–21. The hyoid apparatus of a younger larva is represented on Pl. 22, Figs. 2–3."

Bufo lentiginosus americanus is thus noticed:

"Dwellers in the country are familiar with the voice of this species in the early Spring, which is the season of the deposit of eggs. These are laid inclosed in a long, thick-walled tube of transparent albumen, secreted by the walls of the oviducts. These tubes lie in long spiral strings on the bottoms of the ponds where they are deposited. The young hatch out early, and are of a darker color than those of others of our Salientia. They retain the dark color till near the time of the completion of the metamorphosis. This takes place at an earlier date than that of the Ranæ, and the completed young are scarcely as large as those of the Hylæ or of the Scaphiopus. The voice of this species may be heard well into the summer. It is a sonorous ur-r-r-r-r, which may be readily imitated by whistling while one utters a deep-toned vocal sound expressed in the above letters. Individuals differ in the pitch of their notes, but a chorus of them has a weird sound well befitting the generally remote spots where they congregate and the darkness of the hour. When not thus engaged, they often take up their abode beneath the doorstep of the farmer's house, and issue in the evening to secure their insect food. They progress by hops, and only walk on very rare occasions."

Of *Rana virescens* (*halecina*) it is said:

"This species is especially an inhabitant of swamps. It is found in great numbers in those that border the large creeks and rivers of the Atlantic coast, and is comparatively rare inland, where it gives place to other species. With the *Acris gryllus*, it is the first species heard in Spring, and although its voice is not loud, the noise produced by thousands of them is deafening when heard close at hand, and is transmitted through the atmosphere for many miles. It may be imitated by the syllables 'chock, chock, chock.' As a harbinger of Spring it is always welcome."

The habits of the *Hyla pickeringii* are thus described:

"This, our most abundant Eastern species [of Hyla], is much more generally known by its voice than appearance. After the rattling of the *Acris gryllus* in the marshes and river banks in the lowlands is fairly under way, during the first bright days of Spring, the shrill cry or whistle of this little creature begins to enliven the colder swamps and meadows of the hill country. Different individuals answer each other with differently toned voices of a single note. This is exceedingly shrill and loud; the muscular force employed in expelling the air from the lungs seems to collapse the animal's sides till they nearly meet, while the gular sac is distended with each expulsion to half the size of the head and body together. They are chiefly noisy in the end of the afternoon, but in shady situations or on dark days may be heard through the morning and noon. When the breeding season is over they may be still found, but with difficulty, among fallen leaves in low places, where their color admirably adapts them for concealment, or in cellars, or on the ground in the woods. Not till the near approach of Autumn do we have evidence of their ascent into the trees. Then, when the wind is casting the first frosted leaves to the ground, a whistle, weaker than the Spring cry, is heard, repeated at intervals during the day, from one part of the forest to another, bearing considerable resemblance to the note of the purple finch (*Carpodacus purpureus*), uttered as it is while flying. These voices are heard during the same season; that of the Hyla is distinguishable as slightly coarser, or more like a squeak. Both are associated with the weak chirp of the late *Dendrœca coronata*, as it gleans its insect food on its Southern flight. These are the latest sounds of Autumn, and soon disappear before the steady advance of the ice king."

A bibliography, from which we notice the omission of some titles, and a full index to both plates and text close the book.